NOTES ON ACARI
FOURTH SERIES [1])

BY

Dr. A. C. OUDEMANS

With Pl. VIII—X.

1. Acari of Cape-Colony.

The *Amblyomma*, mentioned in the *Tijdschrift voor Entomologie*, vol. 39, p. 193, with which Dr. Ed. J. G. Everts presented me, were caught in Cape-Colony in 1881. The 4 ♂ and 5 ♀ were determined by Prof. Neumann, of Toulouse, as *A. splendidum* Gieb.

2. Acari of Africa.

On p. 193 of vol. 39 of the *Tijdschrift voor Entomologie* there is question of two *Hyalomma* of unknown locality. One of these ticks I determined with Neumann's *Révision de la Famille des Ixodidés* as *Amblyomma hippopotamense* Denny ♀. This tick is only known as parasitic on *Hippopotamus amphibius.* I may suppose, that my specimen, which I received from Dr. A. W. M. van Hasselt, 1882, is original from Africa and from the same animal.

1) The Ist Series appeared 15, I, 1897, in the *Tijdschrift voor Entomologie*, vol. 39, p. 175—187.

The IInd Series appeared 5, IX, 1900, in the *Tijdschrift voor Entomologie*, vol. 43, p. 99—128.

The IIId Series appeared 30, IX, 1901, in the *Tijdschrift der Ned. Dierk. Vereen.* ser. 2, vol. 7, p. 50—87.

The Series are independent from one another. O.

3. Acari of England.

In May 1883 the Zoological Laboratory of Utrecht received a lot of *Anodonta cygnea* from London. In many of them there were several specimens of *Unionicola ypsilophorus* (Bonz).

4. Acari of Germany.

Jhr. Dr. Ed. J. G. Everts, of the Hague, presented me with some *Disparipes bombi* Michael, found on a *Heterocerus fossor*, caught near Dresden, 1884.

From the same able coleopterologist I received *Oribata geniculata* (L.), found by him among dryed leaves near Pyrmont, July, 1895.

In 1896. I received from Mr. S. A. Poppe the following *Acari*, caught in or near Vegesack:

Laelaps agilis (L. C. Koch), ♂; in a nest of *Mus minutus;* 28, 8, 1896 (see below).

Liponyssus chelophorus Oudms., **nov. sp.**, 2 nymphae; in a nest of *Mus minutus;* 28, 8, 1896 (see below).

Liponyssus muscili (C. L. Koch); 22 nymphae, 1 ♂, 5 ♀, on *Vespertilio serotinus;* Sept., 1896 (see below).

Argas vespertilionis (Latr.), larva, on *Vespertilio serotinus*, Sept. 1896.

Glycyphagus ornatus Kram.; 1 nympha, 1 ♀; in a nest of *Mus minutus*, 28, 8, 1896.

Mr. J. D. Alfken, of Bremen, sent me an *Athous haemorrhoidalis* F., with parasites, caught 8, 6, 1900, near Lesum. The paratites were larvae of *Erythraeus quisquiliarum* (Herm.).

He also caught a *Bombus muscorum* L. in the Isle of Wangeroog, on 3, 6, 1900, on which crawled 9 *Hypoaspis fuscicolens* **nov. sp.** and he picked up the following *Acari* in the city of Bremen:

Parasitus fucorum (de Geer), 47 ex., on *Necrophorus vespillo* L., 11, 7, 1900.

Macrocheles marginatus (Herm.), 4 ex., on *Necrophorus vespillo* L., 11, 7, 1900.

Glycyphagus domesticus (de Geer), numerous specimens in a box with detritus of insects; 11, 1900.

Notaspis humeralis Herm. These were found in numerous specimens, 10, 4, 1901, under the bark of *Quercus robur* L. in the Bürgerpark in Bremen. These mites passed the winter there.

From the same Mr. J. D. Alfken, of Bremen, I received the following Acari, caught in the Badener Berge, near Achim, near Bremen.

Thrombidium gymnopterorum (L.), 3 ex.

Erythraeus regalis (C. L. Koch), 1 ex.

Both were found 5, 4, 1901, under the bark of *Abies excelsa* L.

Trichotarsus intermedius Oudms., **nov. sp.**, 5 ex., on *Stelis phaeoptera* Kirby, a bee, living in the nests of *Osmia leiana* Kirby, another bee, 14, 7, 1900 (see below).

5. Acari of Dutch Guyana.

The species of *Hyalomma*, of Paramaribo, noted on p. 193 of vol. 39, of the *Tijdschrift voor Entomologie*, is determined by Prof. Neumann as *Amblyomma sabanerae* Stoll, ♀. It was caught in 1885.

Some years ago, say in 1895, an *Amblyomma* was caught on a tortoise in the Zoo of Amsterdam. I received the specimen from Dr. H. C. M. de Meijere. As it was determined by Prof. Neumann as *Amblyomma geayi* Nn. ♂, I presume the tick has been caught on *Testudo tabulata*, from Paramaribo.

6. Acari of France.

In the *Tijdschrift voor Entomologie*, vol. 39, p. 137, I wrote: »In January 1886 I found a *Parasitus* in one of the burrows of *Limmoria lignorum* and of other Crustaceans in a wooden pile, sent from Cherbourg, France, to Prof. Hubrecht, Utrecht. Hitherto I did not find a description of this species in any work".

I have now determined my *Acarus* as the male of *Parasitus marinus* (Brady), of which I will say a few words below.

Mr. S. A. Poppe, of Vegesack, sent me some *Acari* found on a bat, *Vespertilio murinus;* in Argenton-sur-Creuse, 7, 1898. They were:

Spinturnix mystacina (Klti.), (see below) and *Liponyssus spinosus* Oudms., **nov. sp.** (see below).

The following *Acari* were sent to me for determination by Dr. F. Heim, of Paris, who caught them in Buré, Meurthe et Moselle.

Parasitus coleoptratorum (L.), deutonympha; in dung in a greenhouse, 9, 1900.

Thrombidium holosericeum (L.), larvae; on *Gryllotalpa vulgaris*, 6, 1900; on *Ophion luteum*, 8, 1900; on *Musca domestica*, 8, 1900; on grashoppers, 9, 1900.

Thrombidium gymnopterorum (L.) nympha and adult, on plants, 9, 1900.

Bdella longicornis (L.), on plants, 9, 1900.

Tetronychus telarius (L.), on *Datura stramonium*, 11, 1900.

Notaspis trimaculatus (C. L. Koch), on a cadaver.

Tyroglyphus agilis Cam., in dung in a greenhouse, 11, 1900.

In July and August, 1900, Jhr. Dr. Ed. J. G. Everts, of the Hague, stayed some weeks in Cauterets (Hautes Pyrenées) and collected the following *Acari:*

Parasitus coleoptratorum (L.), 3 ex.

» *crassipes* (L.), 3 ex.

» *evertsi* Oudms., 1 ex., **nov. sp.** (see below).

» *fucorum* (de Geer), 7 ex.

Macrocheles marginatus (Herm.), 15 tritonymphae heteromorphae femininae generantes.

Emeus pyrenaicus Oudms., 1 ex., nympha, **nov. sp.**

Ixodes ricinus (L.) ♂.

Anystis baccarum (L.), 4 ex.

Oribata geniculata (L.) 2 ex.

In August 1900, Mr. A. Brants, of Arnhem, made a little trip in Bretagne. Near Cancale he saw great quantities of *Ulex europaeus* L., wholly covered with the silvery tissue of millions of red mites, of which he secured a few specimens with which he presented me for a closer examination. The mites were *Tetronychus telarius* L.

7. Acari of the Gold-Coast.

On p. 192 of vol. 39 of the *Tijdschrift voor Entomologie* I wrote:

»I myself picked up two specimens of an *Amblyomma* from a *Testudo tabulata*, arrived at the Zoological Gardens of the Hague from Paramaribo".

This is an error. The tortoise was a *Cinixis erosa* and original from St. George d'Elmina. I picked them up in 1887, Prof. G. Neumann, of Toulouse, determined them as *Hyalomma affine* Nn. ♂.

8. Acari of Borneo.

In 1889 Dr. J. Bosscha Jz., of Sambas, Borneo, sent to Dr. Ed. J. G. Everts *Coleoptera*, amongst which there were a few *Acari*. These belong to two species, one of which is already described by me (*Tijdschrift der Nederlandsche Dierkundige Vereeniging*, ser. 2, vol. 7, p. 53, Plate I, fig. 1—9); whilst the other is new to science. They are:

Neoparasitus oudemansi Oudms., 1 ♂, 5 ♀.

Emeus bosschai Oudms., nymph., **nov. sp.** (see below).

9. Acari of West-Africa.

A few years ago I received three *Thrombidium* which were caught, 1889, by Mr. Godefroy in Suppe (West-Africa). I have determined them with the memoir of Dr. Trouessart as *Thrombidium tinctorium* (L.), 2 ♀, 1 ♂.

10. Acari of Transvaal.

The *Rhipistoma* mentioned by me in the *Tijdschrift voor Entomologie*, vol. 39, p. 193, is determined by Prof. G. Neumann, of Toulouse, as *Haemaphysalis leachi* (Audouin) ♀. They were caught in Transvaal, in 1890.

The *Rhipicephalus capensis* Koch, noted by me in the same journal, same page, were recognised by Prof. NEUMANN as a new species: *Rhipicephalus evertsi* Nn., described by him in the *Memoires de la Société Zoologique de France*, 1897, p. 405—407. I have only to rectify the passage that these animals were *caught* by Dr. EVERTS. In 1890 Dr. EVERTS, of the Hague, *received* them only from Transvaal.

11. Parasitus marinus (Brady).

With Plate VIII, fig. 1—5.

Synonyms: non 1778 *Acarus fucorum* de Geer.

1779. *Acarus fucorum* Fabr. Reise nach Norw.

1781. *Acarus fucorum* Fabr. Sp. Ins. vol. 2, p. 493, n⁰. 36.

1787. *Acarus fucorum* Fabr. Mant. Ins. vol. 2, p. 374, n⁰. 41.

1790. *Acarus fucorum* Fabr. Reize naar Noorw. p. 226.

1790. *Acarus fucorum* Gmel. Syst. Nat. n⁰. 54.

1792. *Acarus fucorum* Oliv. Encycl. Méth. vol. 7, p. 694.

1802. *Acarus fucorum* Turton Syst. Nat. p. 706.

1844. *Acarus fucocorum* Gervais Hist. Nat. Ins. Apt., vol 3 p. 142.

1875. *Gamasus marinus* Brady, in Proc. Zool. Soc. Lond. 1875, p. 307, t. 41, fig. 5—7.

1877. *Sejus marinus* Murray, Econ. Entom. Apt. p. 167, fig.

1890. *Zercon marinus* Moniez, in Rev. Biol. Nord. Fr. p. 13, f. 8—13.

FABRICIUS already found in 1779 an *Acarus* in *Fucus* which he described as follows:

»Acarus fucorum *pallidus; lineis duabus flexuosis nigris, pedibus posticis brevissimis incurvis. Corpus parvum, pediculo minus, totum pallidum, lineis duabus dorsalis flexuosis nigris. Pedes octo breves, unguiculati, postici brevissimi, incurvi*".

I am convinced of it, that his *Acarus fucorum* is the same animal as my mite of Cherbourg (vide supra, p. 278). The mite is pale, and has two curved black lines, when seen on its back. (These lines are two tracts of the intestine, filled with opake particules). The animal keeps its hind legs curved under its abdomen; these legs therefore appear short. All the legs bear strong claws.

Moniez identifies *Acarus fucorum* Fabr. with *Gamasus marinus* Brady. I fully agree with him. But why then has he called the animal *Zercon marinus* (Brady), in stead of *Zercon fucorum* (Fabr.)?

The systematic position of the animal in not yet fixed, as females are still unknown. Moniez calls the animal *Zercon*. This however is wrong, because the genital aperture of the male is situated between the sternal shield and the mentum. Therefore the animal must be placed in one of the following subfamilies: *Parasitinae*, *Laelaptinae*, *Dermanyssinae*, *Spinturnicinae*, or *Caelenopsinae*. Most probably its place is in the *Parasitinae*.

Though I am inclined to consider the animal as a *Hydrogamasus*, I provisorily place it in the genus *Parasitus*, and I am obliged to call it *Parasitus marinus* (Brady), as the specific name *fucorum* is already preoccupied in the genus *Parasitus*.

If the female will prove that the animal belongs to another genus, the specific name of the animal must become *fucorum* (Fabr.).

Brady has well figured the nymph and a few details, but he has not well interpreted what he saw. E. g. the horns of the hypostome are called by him »styliform appendages between the mandibles and the palps". As the mandibles in his animal were thrown forward, he calls them: »longer than the palps". Two masses of opake particules in the intestinal track are called by him »eyes". The mandible figured by him apart, is probably that of an adult female. The figure of the animal in toto is probably that of a nymph. He has positively observed males: »In some specimens the lower parts of the legs are liable to run out into irregular subspinous processes". (See Plate VIII, fig. 1).

Moniez has tolerably well described and figured parts of the male and nymph. He is hesitating to call the animal *Gamasus*, because of the singular epistoma; but if we compare the different epistomata of the species of *Parasitus*, we are obliged to ackwowledge that the epistoma is the last detail to recognise the genus *Parasitus*!

I present to my readers new figures of the *male* (Pl. VIII, fig. 1—5).

There are *two* dorsal shields (Fig. 1) provided with short, stiff hairs. There is (Fig. 2) one sterni-genital shield (like in *Hydrogamasus*) and one ventri-anal shield occupying the whole venter (like in *Hydrogamasus*). On the posterior margin of this shield 5 bristles (like in *Hydrogamasus*). The peritrema is long, reaching till before the coxae 1 (like in *Hydrogamasus*). I don't observe any jugular shields, but my single specimen is badly preserved. The femurs 1, 2 and 3, the genu 3, and the tarsus 2 are provided with chitinous thumblike tubercles. The mandible (Fig. 4) (wrongly represented by Moniez) is provided with teeth only on the distal fourth part of the fingers; the movable finger bears am S-shaped appendage (like in *Hydrogamasus*), split at its distal half (Fig. 4 and 5). The ambulacra (Fig. 3) have a thin membrane between the claws and two accessory claws (like in *Hydrogamasus*). The animal consequently differs from *Hydrogamasus* only in its double dorsal shield and probably too in having no jugular shields.

12. Parasitus evertsi Oudms., nov. sp.

(With Plate VIII, fig. 6—8).

Female. Length 980 μ. — *Colour* like that of *Parasitus cornutus, furcatus, kempersi.* — *Shape* ditto.

Dorsal side (Fig. 6). There are two dorsal shields, just as in the above mentioned allied species. The skin is scaly. On the anterior dorsal shield we observe six rod-like hairs, four on the level of the shoulders, two in the hind part. On the same level as these there is a great pore in the lateral posterior angle, most probably on opening of a gland. The two vertical hairs are strong bristles. — The posterior dorsal shield has only close to its posterior margin four more or less curved rod-like hairs, though smaller than those of the anterior shield, about as long as the vertical hairs.

Ventral side (Fig. 7). All the shields, except the genital shield, have coalesced; genital shield free. The sternal shield nearly quadrangular, with posterior margin excavated, with an edge like an accolade. The genital shield strongly remembers us of that of *Parasitus magnus;* with its anterior margin it follows the excavation of the sternal shield.

Epistoma (Fig. 6) tridentate; the central cusp twice smaller than the lateral ones.

Hypostoma (Fig. 8). The inner malae feathered outward; the outer malae of the usual horn-type, sessil.

Palp (Fig. 8). The first free joint (trochanter) ventrally with two slightly undulated hairs; the second article (femur) with a comblike hair instead of the usual trifurcated one.

Legs (Fig. 6) slender; leg 1 1200 μ., leg 4 1380 μ., coxa 1 with a small but distinct spine distally and anteriorly.

Habitat: decaying leaves.

Patria: South of France.

Remark: Probably this is the female of *Parasitus Kempersi* Oudms. Objections to this supposition are: the different epistoma; the different situation and shape of the hairs of the posterior dorsal shield; the presence of a mentum.

13. Key to the species of Parasitus.

Adults.

1	Two distinct dorsal shields . . .	2.
	Only one dorsal shield	13.
2	Epistoma denticulate, like in Asca peltata	*P. marinus* (Brady).
	Epistoma otherwise	3.
3	♂ horns of hypostome sessil . .	4.
	♂ horns of hypostome pedunculate.	7.
4	♂ tarsus 1 with long spur. . .	*P. magnus* (Kram.).
	♂ tarsus 1 without spur . . .	5.
5	♀ with comb-like hair on 2d joint of palp.	*P. evertsi* Oudms.
	♀ with trifurcate hair on 2d joint of palp.	6.

6	♂ femur 2 with long spur and little tubercle.	*P. furcatus* (G. et R. Can.).
	♂ femur 2 with short spur and big tubercle	*P. cornutus* (G. et R. Can.).
7	No mentum	*P. kempersi* Oudms.
	Mentum present	8.
8	Colour pale	9.
	Colour brown	10.
9	Demarcation between dorsal shields arched backward	*P. rubescens* (G. et R. Can.).
	Demarcation straight	*P. coleoptratorum* (L.).
10	♂ femur 2 with spur and little tubercle	11.
	♂ femur 2 with 2 little tubercles.	12.
11	Epistoma multidentate; anterior dorsal shield two times as long as posterior one	*P. exilis* (Berl.)
	Epistoma tridentate; dorsal shields almost equal in length . . .	*P. longulus* (C. L. Koch).
12	♂ genu 2 with spur directed toward tibia	*P. tiberinus* (G. Can.).
	♂ genu 2 with spur directed toward femur	*P. dentipes* (C. L. Koch).
13	♀ ventral shield posteriorly fused with dorsal	*P. calcaratus* (C. L. Koch).
	♀ ventral shield free	14.
14	Epistoma bidentate	*P. wasmanni* Oudms.
	Epistoma otherwise	15.
15	Epistoma tridentate (forms with *one* dorsal shield; compare above 1 and 11)	*P. longulus* (C. L. Koch).
	Epistoma quinquedentate. . . .	16.
16	♂ horns of hypostome with horizontal thorn	*P. canestrinii* (Berl.).
	♂ horns of hypostome as usual .	17.

17	♂ tibia 2 with long spur or other apophysis directed distally . .	*P. crassipes* (L.).
	♂ tibia 2 otherwise	18.
18	♂ femur 2 with 2 little tubercles.	*P. septentrionalis* Oudms.
	♂ femur 2 with moderate spathulate apophysis	*P. meridionalis* (Berl.).

14. Hydrogamasus salinus Lab.

Synonyms:

1851. *Gamasus salinus* Lab. in Ann. Soc. Ent. Fr. p. 297, tab. 9, fig. 1.

1851. *Gamasus maritimus* Lab. in Ann. Soc. Ent. Fr. p. 298, tab. 9, fig. 2.

1877. *Sejus salinus* Murray, Econ. Entom., Apt., p. 166.

1877. *Sejus maritimus* Murray, Econ. Entom., Apt., p. 166, fig. .

1881. *Gamasus litoralis* G. et R. Can. in Att. R. Ist. Ven. Sc. Lett. Art, vol. 7, p. 2, t. 8, fig. 2*a*, 2*b*, 2*c*.

1882. *Gamasus littoralis* G. et R. Can. I Gamasi italiani, p. 46, t. 5, fig. 2, 2*a*, 2*b*, 2*c*.

1885. *Gamasus littoralis* Can. Prosp. Acarof. Ital. I, p. 72.

1890. *Gamasus littoralis* Mon. in Rev. Biol. Nord. Fr. p. 11.

1892. *Hydrogamasus littoralis* Berl. Ac. Myr. Scorp. Ital. 68, 6.

Laboulbène describes and figures under the name of *Gamasus salinus* an *Acarus* which proves to be the nympha of the animal called afterwards *Gamasus litoralis* G. et R. Can. We have only to compare his description and figure with those of Berlese to be at once convinced of my assertion. Why Berlese has he not drawn our attention on this striking fact? Why has he not at all mentioned *Gamasus salinus* of Laboulbène in his work entitled Ordo *Mesostigmata?*

In the same journal Laboulbène describes and draws another *Acarus* under the name of *Gamasus maritimus,* which cannot be but the adult female of the same animal. Only compare Laboulbène's fig. 2 with Berlese's fig. 1. And yet Berlese says in his Ordo *Mesostigmata,* p. 65 »*Gamasus maritimus* Lab. videtur esse

Gamasus coleoptratorum L." It is impossible not to be surprised at such a suggestion of such an able acarologist as BERLESE. Has he wholly overlooked that *Gamasus coleoptratorum* has *two* dorsal shields, whilst *G. maritimus* of LABOULBÈNE is only protected by one?

The description of LINNÉ'S *Acarus littoralis* does not fit on *Gamasus litoralis* G. et R. Can. It is probably a *Trombidium.*

15. Laelaps (C. L. Koch).

The genus *Laelaps* was created by C. L. KOCH in 1836, with *Laelaps agilis* C. L. Koch as type (KOCH, *Deu. Cr. Myr. Arachn.* 4, 19).

In 1842 KOCH took *Laelaps hilaris* C. L. Koch as type of the genus (KOCH, *Ueb. des Arachn. Syst.* v. 3, p. 88).

At present we know that this is the same animal.

In 1882 G. et R. CANESTRINI created the genus *Stilochirus* for a mutilated male *Acarus,* of which the mandibles were very different from those of all the known *Laelaptinae.* BERLESE examined the specimen and described the characters of the genus in August 1892 in fasc. 70, n°. 13 of his *Acari, Myr. et Scorp. Ital.* The principal character is undoubtedly the styliform mandible, which I will consider as that which distinguishes the genus from all the other genera of *Laelaptinae.*

Now I found several males of *Laelaps agilis* C. L. Koch. Their mandibles are styliform! as I will describe below.

Consequently the mites of C. L. KOCH and CANESTRINI belong to the same genus, which, according to the rules of nomenclature, must, in future, be called *Laelaps* C. L. Koch.

16. Laelaps agilis C. L. Koch.

(With Plate VIII, fig. 9–13).

Hitherto the male of *Laelaps agilis* C. L. Koch was unknown. I have found several males on *Arvicola arvalis*, *Mustela vulgaris*, etc.

Protonympha. I could not distinguish males from females, all having nymphal characters, no genitalia.

Deutonympha. It seems that the deutonymphae are always *generantes;* my specimens at least have genitalia.

The *deutonympha feminina generans* is described und delineated by BERLESE (Ac. Myr. Scorp. Ital. fasc. 39 n°. 1) good enough to recognize the animal.

Deutonympha masculina generans. Length 500 μ. *Dorsal side* resembling that of the *deut. fem. gen. Ventral side* (Fig. 9). The sternal, genital, ventral and anal shields have coalesced and bear 8 stiff bristles on the sternal and 12 on the ventral part. — *Legs.* The coxae (Fig. 9) lack the known spurs of the female; the coxae 2 and 3 have only a stiff bristle. The coxa 2 has a very sharp chitinous spur directed forward. The coxae 3 are large, with a singular hump or protuberance directed forward and outward.

Tritonymphae. They too seem to be always *generantes*, all having genitalia and the females unvariably bearing an egg. The female is dilineated recognizable by BERLESE (loc. cit.).

Tritonympha masculina generans. Length 800 μ. — *Dorsal side* resembling that of the *trit. fem. gen. Ventral side* (Fig. 10) resembling that of the deutonympha. *Legs* wholly unarmed and of the usual shape, except coxa 4, which is a little stronger than the others. Tarsi 2, 3 and 4 provided with 4 strong spines (Fig. 11).

Epistoma. This is the same in ♂ and ♀, rounded anteriorly.

Hypostoma. The hypostoma of ♂ and ♀ are simular. I don't observe interior malae; the exterior ones or horns are knife-like, transparent blades.

Mandibles. Those of the ♀ are very well represented by BERLESE (loc. cit.). Those of male I have figured in fig. 12 and 13. Like in *Laelaps* (*Stylochirus*) *rovennensis* there is a long style or copulation organ and a short transparent appendage at its base. I have distinctly observed and drawn the »pulvillum" or »flagellum" (Fig. 12 and 13, *a*). This is placed on the ventral side of the chela. I consider *b* as the rest of a fixed finger, *c* as the rest of a movable finger, and *d* as the spur comparable with that of the spur of all the other ♂ *Laelaps* (= *Hypoaspis*, see below).

The movable finger is here only a very transparent appendage of the spur; they have coalesced.

Peritrema. Long in females, *short* in males.

17. Key to the species of Laelaps (C. L. Koch).

1 { Exterior malae absent . . . . *L. rovennensis* G. et R. Can.).
{ Exterior malae present. . . . *L. agilis* (C. L. Koch).

18. Hypoaspis Can.

According to the discovery mentioned above (sub *Laelaps*), we are obliged to separate all the other species of the old genus *Laelaps*, to unite them in a new genus.

One of these species, viz. *Iphis globulus* (C. L. Koch) is type of the genus *Leionotus* C. L. Koch 1842 (Koch Ueb. d. Arachn. Syst. vol. 3, tab. 10, fig. 51). It is the same animal as *Laelaps placentula* Berl. 1887 (Ac. Myr. Scorp. Ital. 44, 3). But *Leionotus* is preoccupied by Kirby in 1837.

Another op the species, viz. *Gamasus stabularis* C. L. Koch, is type of the genus *Laelaps* Berl. 1882 (in Att. R. Ist. Ven. Sc. Lett. Art. ser. 5, vol. 8, p. 19). But *Laelaps* is preoccupied by Koch in 1836, as we saw hereabove (sub *Laelaps*).

A third species, viz. *Gamasus krameri* G. et R. Can. was chosen as type of the genus *Hypoaspis* by G. Canestrini 1885 (Can. Prosp. Acarof. Ital. p. 51—55), and, as this name is not preoccupied, it must, according to the rules of nomenclature, be adopted as the name of the present genus, including all the known species of *Laelaps* (hitherto), except *Laelaps agilis* C. L. Koch.

18. a. Hypoaspis fuscicoleus Oudms., nov. sp.

This species will be described in one of the subsequent Series.

19. Emeus pyrenaicus Oudms., nov. sp.

(White Plate VIII, fig. 14 and 15).

Nympha. *Length* 700 μ. — *Colour* pale. — *Shape* oval, with two tops, more or less broad-spool-shaped. — The *dorsal side*

(Fig 14) is protected by a shield, the outlines of which imitate an egg with the top backward, the blunt end, however, tapering too. There are only a few hairs on this shield. Those of the fore-half are somewhat stronger than those of the backhalf, which are minute. The unprotected margin of the body does not show hairs.

The *ventral side* (Fig. 15) has only two shields, an elongate pentagonal sternal one with 8 hairs, and an oval anal one, with 3 hairs.

The *peritrema* reaches the sides of leg 1.

We find the most characteristic feature in the *legs*. When contemplating the ventral side (Fig. 15), we observe that the proportions of the coxae are of the usual type: those of the 2d pair being the largest; follow those of the 3d pair, whilst those of the 1st pair are the smallest. These legs themselves, however, don 't obey this rule, for the first pair surpasses all the others in length and thickness. Curious is the tarsus 1 too, for this is enormous, provided with a distinct sense-organ.

The *epistoma* is of the usual type (Fig. 14).

Habital: decaying leaves.

Patria: South of France.

20. Emeus bosschai Oudms., nov. sp.

(With Plate VIII, fig. 16—18).

Only one specimen, a *nymph*, caught by Dr. J. Bosscha Jz., with beetles, probably among decaying leaves, near Sambas, Borneo.

The systematic position of this animal is not certain, because the ♂ and ♀ are unknown. Yet the nympha is immedately recognizable as one of the *Parasitinae* or *Laelaptinae*. The epistoma is so *Emeus*-like, that I don't hesitate to call the mite an *Emeus*.

Length 1120 μ. *Colour* yellowish-brown, that of the hairs *darker*. The *shape* seen from of above, is a broad ellipse. On the *dorsal side* (Fig. 16) there is one single shield, oval, with the top backward. The anterior margin of the shield is two times slightly excovated; the posterior margin rounded. Behind the posterior and posterier-lateral margins of the shield there is a margin of less chitinised skin, simulating an enlargement of the very dorsal shield. Behind this margin the soft colourless skin is visible. The fore-half of the dorsal shield bears three transverse rows of long spines; the hind-half, inclusive the chitinized and the colourless margin ten rows of smaller spines, arranged in beautiful bows, running from the median line backward and then outward; the bows apparently reaching the shoulders.

The *epistoma* (Fig. 16) is a feathered pointed blade.

The *ventral side* (Fig. 17) shows a subpentagonal sternal shield, wide anteriorly, very narrow posteriorly, reaching the level of the centers of the coxae 4. On the sides of the sternal shield there are two comma-like chitinizations of the skin, belonging to the margins of the foveae of the legs 3 and 4, and imitating metasternal shields.

The anal shield is elliptical. A broom of spines surround the anal shield, fusing with the numerous spines of the dorsal side.

The *hypostoma* (Fig. 17) has broad horns and apparently no inner malae.

The *peritrema* (Fig. 17) is long, projecting before the palps.

The *legs* are short, strong, with a few small bristles. The 2d. leg is the strongest and smallest; than follow the 1st., 3d. and finally the last pair. The tarsus 4 bears long bristles or spines and a *pedunculated* ambulacrum (a long *praetarsus*), a feature which *Emeus halleri* shows in a less degree.

The hairs or *spines of the body* have transparent distal enlargement with feathered edges; this is wider in short spines, nearly invisible in long ones (Fig. 18).

Habitat: decaying leaves.

Patria: Borneo.

21. Key to the species of Emeus Mégn.

1 { Hairs of margin of body small . . 2.
  { Hairs of margin of body long, distinct 4.

2	Body round	*E. ostrinus* (C. L Koch).
	Body oval	3.
3	Posteriorly broad.	*E. halleri* (G. et R. Can.).
	Anteriorly broad.	*E. pyrenaicus* Oudms.
4	Hairs on sternal shield as usual. .	5.
	Hairs on sternal, metasternal, ventral shields and coxae 2 and 3 falciform	8.
5	Post. half of dorsum and venter without broom of bristles	6.
	Post. half of dorsum and venter with numerous hairs forming a broom .	7.
6	Coxae 4 close together.	*E. petrophilus* Berl.
	Coxae 4 far remote.	*E. crinitus* (C. L. Koch).
7	Only one species.	*E. bosschai* Oudms.
8	Only one species.	*E. falcinellus* (G. Can.).

22. Key to the genera of Laelaptinae.

1	No peritrema	2.
	Peritrema present	3.
2	Legs 1 with ambulacrum	*Greenia* Oudms.
	Legs 1 without ambulacrum . . .	*Iphiopsis* Berl.
3	Legs 1 with ambulacrum	4.
	Legs 1 without ambulacrum . . .	10.
4	♀ femur 4 without spur	5.
	♀ femur 4 with spur	9.
5	Mandibles chelate in both sexes. .	6.
	♂ mandibles not chelate	8.
6	♂ with sterni-giniti-ventri-anal shield	*Hypoaspis* Can.
	♂ with anal shield separate (degenerate forms)	7.
7	Epistoma with long feathered mucro	*Emeus* Mégn.
	Epistoma scarcely pointed	*Seiulus* Berl.
8	♀ mandibles normal; ♂ a style. .	*Laelaps* C. L. Koch.
	♀ mandibles a pin, with an appendage dentate on outside . . .	*Berlesia* G. Can.

9	Only one genus	*Neoberlesia* Berl.
10	Legs 1 normal	*Neopodocinum* Oudms.
	Legs 1 very long	*Podocinum* Berl.

23. Liponyssus musculi C. L. Koch.

(With Plate VIII, fig. 19—22 and IX, fig. 23—26).

Amongst 28 specimens, found by Mr. S. A. Poppe on *Vesperugo serotinus*, there were 22 nymphae, 1 ♂ and 5 ♀.

I am in the opportinuty to correct some of Berlese's statements, as to the ♂ and ♀.

Nympha. Length 360—400 μ., when swollen 400—720 μ. — *Colour* white or pale. — *Dorsal side* (Fig. 19) protected by: 1. one anterior dorsal shield, subpentagonal, reaching the middle of the dorsum, scaly, and bearing 10 pairs of hairs of nearly equal length; 2. one small posterior dorsal shield, subquadrangular, scaly, and bearing 3 pairs of hairs of nearly equal length; and 3. four minute intermediate shields. The remaining of the dorsum is finely wrinkled and provided with hairs of nearly equal length. — *Ventral side* (Fig. 20). Remarkable are: a subheptagonal, scaly sternal shield with 6 stiff hairs and a small oval anal shield, with top turned backward and with cribrum. — The *peritrema* (Fig. 19) is short and has sometimes the aspect as if hanging with its two ends on the body like the handle of a tea-cup. *Epistoma* (Fig. 21) a thin transparent blade with point forward and denticulate edges of the distal half. — *Mandibles* (Fig. 22) smooth, without teeth, and provided with a transparent appendage. — *Hypostoma* (Fig. 23) with slender horns, provided with a transparent appendage in top, pointed fused inner malae, and 6 long fine hairs. — *Coxa* 2 with a little tubercle anteriorly.

Male (Fig. 24). The scaly dorsal shield resembles that of the females of *L. sylviarum* (Can. et Fanz.) and *L. lacertarum* (Cont.). It corresponds with the *two* dorsal shields of the female. Berlese describes it as »in partes duabus distinctissime diviso"! The dorsum is provided with *bristles*, not with hairs. *Ventrally* (Fig.

24 A) all the shields have fused into one long sterni-geniti-ventri-anal shield, of which the four parts are tolerably discernable. The *coxa* 2 bears a pin anteriorly, and of its two usual hairs the anterior one is a big one (Fig. 24 B). Of the coxa 3 the anterior hair is wholly transformed in a flat chitinous hook with a wing (Fig. 24 B).

Female. (Fig. 25). The two *dorsal shields* are scaly. The anterior dorsal shield perfectly corresponds with that of the nympha. The posterior one, corresponding with the part of the dorsum of the nympha, occupied by the wrinkled shin, the 4 intermediate shields and the posterior dorsal shield, is almost piriform, with truncated anterior margin, and provided with 6 stiff bristles and 6 smaller ditto quite posteriorly. When the female is half-fed, the dorsal shield occupies nearly one fourth of the dorsum, which is moreover provided with almost regular, longitudinal rows of hairs. — The *sternal shield* (Fig. 26) is trapezoidal, somewhat excavated posteriorly, and provided with the usual 6 hairs. It shows, however, the striking peculiarity, that its posterior third part is stronger chitinized than the anterior two third parts, and more lightrefracting, *and this may have led* Berlese *to tell us that »the sternal shield is only a transverse rod with one hair on each end: vitta transversa chitinea!"*

The *genital shield* is long, reaching anteriorly the sternal shield, posteriorly running far beyond the coxae 4. It is provided with two bristles between the coxae 4, has distinct edges posteriorly, and becomes indistinct anteriorly, *where the skin is wrinkled in such a way*, *as if the genital aperture were not transverse*, *but longitudinal*, like that of *Ophionyssus natricis* (Gerv.).

The *anal shield* is long, almost piriform, with distinct *cribrum.* The venter moreover is provided with many hairs, surrounding the back-half of the genital shield and the anal shield. The *legs* are slender (Fig. 25). *Coxa* 1 has a sharp thorn anteriorly.

24. Liponyssus chelophorus Oudms., nov. sp.

(With Plate IX, fig. 27—29).

The name *Leiognathus* was chosen by CANESTRINI as the chelae of these animals have no teeth. Therefore it is very remarkable that one of the species has chelae *with teeth*. It is the best proof, that these animals descend from animals with chelae with teeth.

I have two nymphae, found by Mr. S. A. POPPE in a nest of *Mus minutus*, 28 Aug. 1896, in Vegesack.

The *nymphae* resemble so strikingly those of *Liponyssus musculi* (C. L. Koch), that it was at first not easy to observe the differences. Yet there are many.

In the first instance the chelae (Fig. 29). These are distinctly toothed; both fingers with three cusps; the first of the movable one passes the first of the fixed finger. A distinct sense-organ on the fixed one is present too.

Further the scaly dorsal *shields* (Fig. 27). There are two large and six smaller ones, whilst that of *Liponyssus musculi* (C. L. Koch) shows two large and only 4 smaller ones. Both are longer than in *Liponyssus musculi*, so that the anterior shield reaches more backward and the posterior one more foreward here; therefore the space between the two shields is relatively narrower here. The two smaller shields of *musculi* correspond with the most anterior two of *chelophorus*. The rest of the dorsal surface is striated, like in other species.

The *sternal shield* (Fig. 28) is subpentagonal, wide, pointed posteriorly; this point does not reach the level of the centres of the foveae 4. The anal shield small, remote from the sternal nearly the length of this latter shield. Before the anal shield only six hairs, whilst *L. musculi* has 4 pairs between the anal and sternal shields.

The *epistoma* is reaching far more forward, blade-like, anteriorly with an incision in the middle (Fig. 27).

The *hypostoma* does not show the transparent distal appendages on the horns, like in *L. musculi*.

The *peritrema* resembles that of *L. musculi* (Fig. 28). My drawing is made from a specimen treated with caustic kali.

The *legs* are shorter and thicker than in *L. musculi* (C. L. Koch); especially legs 1 and 2; the tarsi 1 have no long tactile hairs. The femurs 1 and 2 have 2 strong bristles dorsally, planted on a tubercle each.

Length 510—580 μ. *Colour* pale.

Habitat: nest of *Mus munitus.*

Patria: Germany.

25. Liponyssus spinosus Oudms., nov. sp.

(With Plate IX, fig. 30—31.

Female. Length 560 μ. *Colour* straw-coloured. *Shape* like that of *L. albatus* (C, L. Koch). *Dorsal side* (Fig. 30). Besides the distinct shoulders on the level of the legs 2, the animal shows two distinct intermediate shoulders on the level of legs 1. Moreover the outlines are oval, with nearly parallel sides and rounded posterior end of abdomen. The dorsum is protected by a scaly shield, following in outlines the shoulders and the vertex, oval posteriorly, resembling that of *Lip. albatus,* mentioned above. But this shield is provided with short and thick spines. The unprotected abdomen bears spines too. At the sides a small portion of the peritrema is visible.

Ventral side (Fig. 31). The sternal shield is nearly trapezoidal, but still longer than in *Lip. albatus.* The genital shield is well chitinized and may be considered as a fusion of a genital and a ventral shield, resembling that of some species of *Laelaps.* The anal shield has the usual three spines and posteriorly the *cribrum.* The ventral and anal shields are flanked with spines.

The *peritrema* runs forward to the level between the legs 2 and 1.

I could not well distinguish the structure of the *hypostoma*, but it bears 6 thick spines, 4 anterior and 2 longer posterior ones (Fig. 31). The *palpi* are thick, but do not show any particulars. The *epistoma* is rounded anteriorly (Fig. 30).

The *mandibles* are of the usual type, having no teeth.

The *legs* 1 and 2 are thick, having thick and short joints, of which the trochanter only is narrow. The femurs 1 and 2 have on their dorsal side *a chitinous transverse bar bearing two spines directed over the dorsum.* The legs 3 and 4 are much slenderer.

Remark. The presence of a rudimental ventral shield is remarkable, for it is a proof that these animals descend from animals with a ventral shield.

Habitat: Vespertilio murinus.

Patria: France.

26. Key to the species of Liponyssus Klti.

Nymphs.

1	With 6 intermediate shields . . .	2.
	With 4 ditto	3.
2	Legs slender, esp. 1 and 4 . . .	*L. rhinolophi* Oudms.
	Legs thick and short, esp. 1 and 2	*L. chelophorus* Oudms.
3	Post. dors. shield with 6 spines .	*L. musculi* (C. L. Koch).
	Post. dors. shield with 2 spines .	4.
4	Post. dors. shield half as wide as ant.	*L. lacertarum* (Cont.)
	Post. dors. shield much narrower .	*L. saurarum* Oudms.

Males.

1	With broom of bristles around anus	*L. corethroproctus* Oudms.
	Without broom	2.
2	With 2 enormous curved spines on each side	*L. uncinatus* (Can.)
	Without such unci	3.
3	Dorsal shield narrow, surrounded by unprotected skin	*L. musculi* (C. L. Koch).
	Dors. shield wide, occasionally and especially posteriorly surrounded by narrow unprotected margin .	4.

4	Femur 3 with spur	*L. lacertarum* (Cont.)
	Femur 3 unarmed	5.
5	Peritrema reaching level between coxae 3 and 2	*L. saurarum* Oudms.
	Peritrema passing coxae 1 . . .	*L. albatus* (C. L. Koch).

Females.

1	Two dorsal shields	*L. musculi* (C. L. Koch).
	One dorsal shield	2.
2	Sternal shield present	3.
	No sternal shield more	*L. uncinatus* (Can.)
3	Sternal shield trapezoidal . . .	4.
	Sternal shield linear	*L. sylviarum* (Can. et Fanz.)
4	Legs 1 and 2 thick and short; femur 1 and 2 dorsally with 2 spines each	*L. spinosus* Oudms.
	Legs 1 and 2 not so thick . . .	5.
5	Dorsal shield wide, occasionally and especially posteriorly surrounded by unprotected margin . . .	6.
	Dorsal shield narrow, surrounded by hairy unprotected skin . . .	7.
6	Coxa 2 with 2 spines, one forward and one backward; coxa 3 with 2 spines backward	*L. albatus* (C. L. Koch).
	Coxa 3 with one spine forward .	*L. corethroproctus* Oudms.
7	Peritrema reaching coxa 2; dors. shield without constriction in the middle	*L. lacertarum* (Cont.)
	Peritrema passing coxa 1; dors. shield with constriction in the middle	*L. saurarum* Oudms.

27. Spinturnix mystacina Klti.

With Plate IX, fig. 32—37 and X, fig. 38—42.

Embryo. — *Length* 640 μ. — *Colour* white, with straw-coloured hairs and peritrema. I have dissected the embryo out of the mother's uterus. The figures 32 and 33 represent them still in their envelops. I have also cut the envelops, but the embryo did noth stretch its legs, even after being treated with caustic kali.

Fig. 32 shows the *embryo* viewed *dorsally*. There are two dorsal shields, a larger anterior and a smaller posterior one. Both are without any markings, but provided with senseorgans (Fig. 34), of which 5 pairs are visible on the anterior and 2 pairs on the posterior shield. The anterior shield is subpentagonal; its posterior edge is deeply excavated trapezoidally to receive the anterior portion of the posterior shield. The shields are separate by a narrow space. The dorsal side shows the following hairs: 4 pairs before the anterior dorsal shield, 1 pair aside, 1 pair near the stigma, 1 pair above coxae 4, 2 pairs behind the posterior shield. The capitulum, the epistoma, the first joints of the palpi and legs are visible beyond the margin of the body. *It is obvious that the stigma is ventral;* the peritrema first runs dorsally, forward, and then ventrally between the coxae 2 and 3.

Fig. 33 represents the *embryo* viewed *ventrally*. Remarkable on this side are: the legs 1, 2 and 3 have already their definitive position, i. e. quite close together, whilst legs 4 are still remote a considerable distance; the legs 4 are not so far developed as legs 1, 2 and 3, being still winkled. This is a proof that the embryo passes through a *larval stage* with 3 pairs of legs, after which stage it gets its *nymphal* pair of legs. The stigma is ventral; between coxae 2 and 3 the top of the peritrema is discernable and a hole, the opening of the excretory organ.

Protonympha. Length 730 μ. *Colour* light straw-coloured.

Fig. 35. The *protonympha* shows *dorsally* the two dorsal shields, exactly like in the embryo, but provided with pits (*Erosionsgruben*

Kolenati). The skin in these pits is smooth, whilst it is provided with numerous pores between the pits. The anterior dorsal shield is provided too with the 5 pairs and the posterior one with the 2 pairs of sense-organs. The dorsum further shows exact the same hairs as the embryo. The *stigma* is *ventral;* the peritrema for the greater part dorsal. Remarkable are the two groups of pits in the anterior portion of the shield, quite median, and the indistinct 4 longitudinals rows of other pits.

Fig. 36 is the *ventral* side of the *protonympha*. Remarkable features are: the *stigma*, the end of the peritrema and the opening of the excretory organ. The sternal shield is subpyriform, with a little top posteriorly, provided with 6 hairs. Between this shield and the anal one 4 pairs of hairs. The anal shield is small.

The *legs*. The dorsal rows of hairs of all the legs are characterized as follows: the trochanter has no hairs or very small ones, the femur and genu the longest hairs. The lateral rows of all the legs are robust, stiff, and curved generally somewhat backward Of the ventral rows the outer rows show robust hairs on the following joints, directed outward:

leg. 1:	,	trochanter,	,	genu,	tibia,
2:	coxa,	trochanter,	femur,	genu,	tibia,
3:	,	trochanter,	,	genu,	tibia,
4:	,	trochanter,	,	,	tibia.

Deutonympha. — Length 1000 μ. Colour darker straw-coloured. Fig. 37 represents the *dorsal* side of it. The principal differences between this nympha and the protonympha are especially the following: 1. There is only *one* dorsal shield, which ows its origin to the fusion of the two dorsal shields of the latter. 2. Instead of one hair above the coxa 4 it is provided with about 16 pairs of long hairs! The *stigma* is more lateral than ventral.

Fig. 38 shows us the *ventral* side of the *deutonympha*. It differs from the protonympha by: 1. There is a small *jugular shield;* 2. The sternal shield is better chitinized, more shield-shaped than pyriform, provided with 2 pairs of pores; 3. Between the sternal and anal shields not 4 but about 16 pairs of hairs; 4. The peritrema reaches ventrally more inward; 5. The anal shield is more pyriform, longer; 6. The legs are somewhat longer than in the protonympha. About the hairs of the dorsal and lateral rows the same as the protonympha. Of the ventral rows the outer rows show robust hairs, directed outward, on the following joints:

leg. 1:	,	trochanter,	,	genu,	tibia,
2:	coxa,	trochanter,	2 on femur,	genu,	tibia,
3:	,	trochanter,	(femur) ,	genu,	tibia,
4:	,	trochanter,	,	genu,	tibia.

I have put the femur 3 in parentheses, because I have individuals in which the mentioned hair is minute, and others, where it is robust.

Fig. 39 is a *male*, seen from above. *Length* 1000 μ. — *Colour* between straw- and isabel-colour. — The principal differences between the male and the deutonympha are: 1. Between the palps the two dorsally crooked appendages of the mandibles are visible; 2. The *stigma* is dorsal.

Fig. 40. And on the *ventral side:* 1. The sternal shield is much larger, excavated anteriorly to receive the chitinous ring of the genital aperture, and having angles in the direction between the coxae 1 and 2, and between the coxae 2 and 3; 2. There are small *intercoxal shields* between coxae 1 and 2.

The males are immediately recognizable, even by a pocket magnifying-glass, by their long and slender *legs*. About the hairs of the dorsal and lateral rows, the same as in the proto- and the deutonympha. Of the ventral rows the outer rows show robust hairs, directed outward, on the following joints:

leg. 1:	,	trochanter,	,	genu,	tibia,
2:	coxa,	trochanter,	1 or 2 on femur,	genu,	tibia,
3:	,	trochanter,	femur ,	genu,	tibia,
4:	,	trochanter,	,	genu,	tibia.

Fig. 41. *Female, dorsal view.* The female, delineated by me is a pregnant one, with full grown embryo. — The *colour* of the unprotected skin is pale; the dorsal shield is red-brown; the coxae and the sternal shield brown; the legs dark, from straw-

coloured to isabel-coloured. — *Length* (pregnant) 1520 μ. — Remark that the *stigma* is *ventral*, the peritrema only ventral and lateral; *no question of dorsal stigma and peritrema!* The female has behind the dorsal shield much more (and smaller) hairs than the deutonympha and the male.

Fig. 42. *Female. Ventral side.* — The sternal shield is between pyriform and circular. The jugular and intercoxal shields present. Behind the sternal shield the transverse genital opening, sometimes scarcely, at other instances very easily observable. Behind this split a small long-triangular *genital shield!* and then about hundred small hairs, before the small, circular anal shield.

The *legs* in the females are thicker than in the other stages. All what is said of the hairs of the legs of the males, is applicable here too.

Habitat: Vespertilio murinus, V. dasycneme, Vesperugo noctula, Plecotus auritus.

Patria: Netherlands, Germany, France, Russia.

28. Key to the species of Spinturnix v. Heyden.

1	Dorsal shield of male subcircular; fingers of mandibles smooth; female abd. broad and round . .	*Sp. euryalis* (Can.) [1]
	Dorsal shield of ♂ rhomboid; fingers of mandibles denticulate; ♀ abd. small, rounded	2.
2	All the hairs of the ventral side of the legs small	*Sp. vespertilionis* (L.)
	Some of the hairs of the outer row on the ventral side of the legs robust, planted and directed outward	*Sp. mystacinus* (Klti.)

1) Most probably this species does not belong to the genus in question. O.

29. Thrombidium tinctorium (L.).

(With Plate X, fig. 43—48).

»La moindre figure de caractères vaut mieux qu'une description de trois pages". Thus TROUESSART in *Annales de la Société Entomologique de France; Bull. Entom.; Séance du* 14 *Nov.* 1894, *p. CCXLVII*, when criticising HUGO ZIMMERMANN's paper on some *Sarcoptidae Avicolae.*

Meanwhile it is quite insufficient to give one single figure of the end of a leg of *Thrombidium tinctorium* (L.), as will be seen below. How many large *Thrombidiums* will still be discovered with the character (tarsus shorter than tibia 1) drawn by Prof. TROUESSART?

Prof. TROUESSART says he has examined sundry specimens of different tropical regions. Yet he seems not to have observed the *enormous differences in length of the legs* in different specimens, even of the same locality.

In my figure 43 you contemplate a »longlegged" form, with almost yellow legs, with brownish streak on the dorsal side of the joints of the legs, and brownish hairs on the distal ends of these joints. If we compare these particulars with those given by C. L. KOCH of his *Thrombidium flavipes* (Uebers. d. Arachn. syst. v. 3, p. 45, tab. 8, fig. 39), we must admit this his »unique specimen, caught in the neighbourhood of Bordeaux" and hitherto not refound by French entomologists, was nothing but a long- and yellow-legged individual of *Thrombidium tinctorium* (L.), most probably brought in Bordeaux by the navigation from tropical regions, and strayed in the environs of the sea-port town. Therefore I consider KOCH's *Thrombidium flavipes* synonym to *Thrombidium tinctorium* (L.).

TROUESSART does not say anything of the furrows on the animal's *dorsal side.* These are characteristic enough (Fig. 43). In the foremost third part three longitudinal furrows, united posteriorly by an almost transverse furrow; this is bowed somewhat forward; the outer of the three above mentioned furrows extend farther backward over the middle third part of the abdomen, but these their extensions are bowed outward, so that they form with the forward curved transversal furrow a posteriorly open circle. In the centre of this circle there is a deep pit. In the hindmost third part of the dorsum there is a second deep pit, central or median too, and there are indistinct continuations of the lateral longitudinal furrows, again bowed outward, but more remote one form another.

Trouessart does not tell us anything of the animal's *ventral side,* and this is characteristic too. Fig. 44 shows us the total coalescence of the bases of the maxillae and of the maxillae themselves; the long coxae of the first pair of legs, which almost touch in the median line, and leave a light coloured triangle between the maxillar plate and themselves, and a light coloured line between their own proximal ends; the nearly triangular coxae of the second pair of legs, contignous with the coxae 1; the nearly triangular coxae 3; the broad and nearly trapezoidal coxae 4; the enormously developed trochanteres 3 and 4, especially 4; the genital split, shut by the two genital covers, which by their transparency give us to appear the 6 genital suckers; the position of the genital opening, being one third before and two thirds behind the level of the distal ends of the coxae 4; the tolerably small anus, covered by two anal plates and situated far backward, being remote from the posterior margin of the abdomen not even its own width; and finally the light colour of the ventral side itself and the dark, almost brown colour of the chitinous parts of it.

The *hairs* are well described by Trouessart, viz: they being „des poils fasciculés". Yes, but there are great differences between the „poils fasciculés" (I propose the term „hairy hairs") of different species. In figure 45 I have drawn one of the dorsum of our present species. It is obvious that the small hairs which ornament our hair are the largest on its proximal and the smallest on its distal end, and that they are deviating almost 45 degrees from the stem on its proximal end, and the lesser the more they reach the distal end. The stem is hairy all around, but I cannot discern an arrangement of its villosity in a quincunx, as Pagenstecher tells us of *Tr. gymnopterorum* (L.) (N. B. called by him *Tr. holesericeum* (L.) (sic!))

Of the *legs* it is necessary to mention that, according to their lengths the range is: 1, 2, 4, 3; that the hairs of the last pair are in geveral longer, those of the first pair in general shorter; that of all the legs the proximal joints bear in general longer hairs than the distal joints; and that the distal ends of all the joints of all the legs bear in general longer hairs than their proximal ends. — I don't observe any hairy caruncle (pulvillum, scopula) on the legs. TROUESSART asserts it is present.

The *mandibles* (Fig. 46) have a very short blunt and rounded fixed finger (*m. d. f.*) and a claw-like large movable one (*m. d. m.*). They pinch between their bases the stigmata (*s*).

The *maxillae* (*mx*) are wholly fused together. Their palps are inserted *on the dorsal side* (!) of the coalesced bases of the maxillae (*m. p.*). The triangle formed by the maxillae and the mandibles is distinctly demarcated from the rest of the body (along the line *a*). Consequently there is a very *pseudocapitulum* or *capitulum*, which is *flat* and *horizontal* on its dorsal side.

Immediately behind the capitulum, behind the line *a* (Fig. 46), the abdomen (or notogaster) stands perpendicularly (between the lines *a* and *b*. Further the abdomen covers, like a prominent forehead the capitulum, in some individuals partly (Fig. 43), in others, especially females, even so far, that only the »claws" of the palps are visible, when the animal is viewed from its dorsal side.

In fig. 46, *o* signifies the base of the pedunculate eyes, which are situated on the same level with the foremost, dark coloured, well chitinized part of the *crista*, so that the *pseudostigmata* are an a level *behind the eyes*. In fig. 46 *p* 1 signifies the implantation of the first pair of legs, which are consequently on a level *before the eyes*.

Fig. 47 represents the greater part of the *crista*, with the two *pseudostigmata* and the *pseudostigmatic organs*.

On page XLIV of the *Bulletin Eutomologique* (*Annales de la Soc. Ent. de Fr.*, 1894) Prof. TROUESSART mentions that he has been in the »occasion to observe this organ in the large *Trombidiums* of the intertropical regions (*Thrombidium tinctorium*, etc."). He then describes the *crista* of *Thrombidium tinctorium*, and does not make any mention of those of the »etc." species. I cannot believe that the *crista* of *Thr. dugesi* and *Thr. gigas* are perfectly the same in all details as that of *Tr. tinctorium*. In this description he compares the *pseudostigma* with a thimble, and indead it is a hyalin thimble-like cup. Also the pseudostigmatic organ is well described by him. Both pseudostigma and pseudostigmatic organ are further compared with the same organs of *Oribatidae*.

It was however already in 1885 that Berlese compared these organs of *Tarsonemidae* with those of *Oribatidae* which led him even to unite these two families into one group. At present we know that *Tarsonemidae* are in no relation with *Oribatidae*, but are *Prostigmata*, like the *Thrombidiidae*, so that they even are united by some authors with the last mentioned family into one and the same group.

Then (p. XLV, sqq. of the same Bulletin) Dr. Trouessart compares the *two areolae with their pseudostigmata* of *Thrombidium tinctorium* in particular, and those of the *Thrombidiidae* in general with the pair of median eyes of *Smaris lyncaea*, and on the likeness of these two different organs he bases a hypothesis which derives the *areolae with their pseudostigmata* from median *eyes*. Now I think this hypothesis crumbles at once as *Smaris lyncaea has no median eyes at all!* This so called pair of median eyes are nothing else but again *areolae with pseudostigmata!* (See my paper »Drei neue Acari von der Insel Juist", — *Abh. Nat. Ver. Brem.* 1901, v, 17, p. 226).

Therefore we should only have to compare the *position* of the areolae with the median eyes of *Gigantostraca*, *Xiphosura, Scorpiones*, *Thelyphones*, *Phrynes*, *Araneae*, *Galeodeae*, *Phalangida* and among the *Acari*: of the genera *Limnochares* and *Eulais*, which latter, like the areolae of *Thrombidium*, are enclosed within a chitinous apparatus.

But, if we are *comparing*, we are obliged to admit another hypothesis, viz. that the *single* median eye of the genera *Michaelia*, *Ammonia* (both *Thrombidiidae*), *Hydryphantes*, *Thyas*, *Eupatra*, etc. (all *Hydrachnidae*), has its origin in a confluence of the *two* median eyes of their ancestors. And if this is adopted, we must go farther and reason, that it is very probable that the single median pigment-spot of *Halacaridae* is originated from a single median eye of their ancestors. But alas, what rests of the hypothesis, since I have found in the same larva of *Thrombidium areolae* (*pseudostigmata*) *together with a median pigment spot?* (This curious larva will be described and figured in a subsequent contribution to the knowledge of *Acari*).

On p. 87 of the *Annales de la Société Ent. de Fr.*, 1894, Dr. Trouessart writes, that he possesses a large quantity of larves of *Thrombidiums* of warmer regions, and also some larvae called *Tlazahuatl* in Mexico. Further he says: »Elles ne diffèrent ni par la taille, ni par aucun caractère de valeur spécifique, de notre type indigène pas plus qu'elles ne diffèrent entre elles". It is impossible to me to agree with him, since I have examined six different larvae. *They widely differ one from another!* But I agree with him where he asserts: »il est impossible de déterminer l'espèce à laquelle elles se rapportent". Yet it is a pity that he has not described and figured the different larvae in his possession, for the knowledge of these larvae, their segmentation, their pseudostigmata, their pseudostigmatic organs, their »Urtracheeen", and their dermic shields is of great value.

On p. 88 he asserts that *Thrombidium tinctorium* »se décolore complètement". In how much time, I may ask, for my specimens of 1889 and 1896 are yet coloured light vermillon. In dissecting my *Thrombidium tinctorium* a kind of coloured oil flowed out of the abdomen of one of my ♀. Dr. Trouessart states that only *Thrombidium gigas* possesses »de gouttelettes de graisse fortement colorée en rouge orangé".

On p. 90 he cites amongst the characters of *Thr. tinctorium*: »Ongle du palpe dépassant l'extrémité de la massue du dernier article". We have only to contemplate my fig. 48, which is drawn with the aide of a camera lucida of Abbe, to be convinced at once of the fact, that the »claw" of the palp is just as long as the »club".

In the beginning of this my article of *Thr. tinctorium* I said already that the legs vary much in length. This difference is so large, that my two females should belong to two different species, if we only attached value to the length of their legs!!

I give here a table of measures of my eight specimens. They are exact in hundredths of millimeters.

Remarkable are the enormous legs of the male n° 3 and of the female n° 2.

	Males						Females	
	1	2	3	4	5	6	1	2
Length of body with palps	9.34	7.30	9.34	8.46	9.34	9.00	13.00	13.50
Length of notogaster	7.30	5.25	7.00	6.71	7.30	7.00	11.50	12.50
Width of body on shoulders .	5.25	4.96	4.96	5.25	5.25	5.50	9.00	9.50
Length of first leg.	6.57	6.57	6.71	5.78	6.42	6.27	7.59	9.49
Length of fourth leg	4.96	4.96	4.96	5.11	4.96	4.96	6.71	7.88
Length of tibia of leg 1 . .	1.60	1 60	1.60	1.31	1.46	1.60	1.75	2.62
Lenth of tarsus of leg 1 . .	1.46	1.46	1.31	1.02	1.11	1.16	1.60	2.04

30. Trichotarsus intermedius Oudms., nov. sp.

(With Plate X, fig. 49—50).

Hypopus. -- *Length* 196 μ. — *Dorsal side* (Fig. 49). We observe *two dorsal* shields. In some particulars the animal is allied to *Tr. ornatus* Oudms., *Tr. manicati* Giard and *Tr. trifilis* Can., e. g. by having no strong bristles, and by two dorsal shields. But in other particulars it approaches *T. osmiae* (Duf.), *Tr. alfkeni* Oudms., *Tr. koptorthosomae* Oudms., *Tr. xylocopae* (Donnad.), *Tr. bifilis* Can. and *Tr. japonicus* Oudms., e. g. by its being hairy and by the absence of a claw on tarsus 4. Therefore I have called it *Tr. intermedius*. The markings on the shields imitate scales with blunt edges. Besides the two rostral and the two edge-hairs, there are two pairs of other hairs, directed backward on the anterior, nearly triangular shield. The posterior shield has 5 transverse rows of 4 hairs each, thus segmentally arranged. The hyalin posterior margin of the sucker-plate profects beyond the posterior edge of the abdomen.

Ventral side. (Fig. 50). Behind the shoulders there is a hair, directed outward and backward, therefore being visible when the animal is viewed on its dorsal side. The sucker-plate is small and contents eight distinct suckers, of which two are large, the other six smaller and of equal size, standing before, on the sides, and behind the two large ones. Moreover on the sides of the two anterior suckers there is an indication of two other suckers.

Legs. The tibiae 1—3 bear a long tactile hair. The tarsi 1—2 bear one olfactory hair, one short and two long tactile, and four lancet-shaped hairs. The tarsus 3 is provided with one tactile hair and four lancet-shaped hairs. The tarsus 4 has 5 hairs, of which two have the dimension of about 20, two of about 75 and one of about 120 μ. The tarsi 1—3 have minute claws.

Habitat: on *Stelis phaeoptera* Kirby, a bee living in the nests of *Osmia leiana* Kirby.

Patria: Germany.

31. Trichotarsus Can.

If we study the *hypopi* of the different species of *Trichotarsus* yet known, we immediately observe two groups. In one of them, which I will call group α, we are obliged to join the more tender forms, with *minute claws*, setiform, or even minute hairs and *two dorsal shields.* And in the other group, say group β, I should like to unite *T. osmiae*, *xylocopae*, and the others, which have the same external feature, viz. an almost *round body, enormous claws* and *strong bristles.*

On examining the forms of the group α, we may separate one of the species, which has many hairs, no claw on tarsus 4, and a form intermediate to the other species of group α and those of the group β. I have therefore called this species *Tr. intermedius.*

On the other side, in group β, *Tr. osmiae* approaches the species of group x, by having *two dorsal shields*. I therefore propose the following division and key.

32. Key to the species of Trichotarsus Can.

Hypopi.

1	Two dorsal shields; tarsi 1—4 with minute claws; circumference of body suboval; dorsum almost hairless; *group A*.	2.
	Tarsus 4 without claw	4.
2	Tarsi 1—3 without lanceolate hairs.	3.
	Tarsi 1—3 with lanceolate hairs .	*Tr. ornatus* Oudms.
3	Six suckers on the suckerplate . .	*Tr. manicati* Giard.
	Eight suckers	*Tr. trifilis* Can.
4	Two dorsal shields; tarsi 1—3 with minute claws; circumference of body suboval; dorsum with hairs; *group B*	*Tr. intermedius* Oudms.
	Tarsi 1—3 with strong claws: circumference of body subcircular; dorsum with strong bristles . .	5.
5	Two dorsal shields; *group C* . .	*Tr. osmiae* (Duf.).
	One dorsal shields; *group D* . .	6.
6	Tarsi 1—3 with 1 claw	7.
	Tarsi 1—3 with 2 claws. . . .	10.
7	Tarsus 4 with one hair	8.
	Tarsus 4 with two hairs	9.
8	Tarsus 1 without lanceolate hairs .	*Tr. xylocopae* (Donnad.)
	Tarsus 1 with lanceolate hairs . .	*Tr. koptorthosomae* O.
9	Tarsi 1—3 without lanceolate hairs	*Tr. bifilis* Can.
	Tarsi 1—3 with lanceolate hairs .	*Tr. japonicus* Oudms.
10	Only one species	*Tr. alfkeni* Oudms.

Arnhem, 1 Sept. 1901.

EXPLICATION OF THE FIGURES.

PLATE VIII.

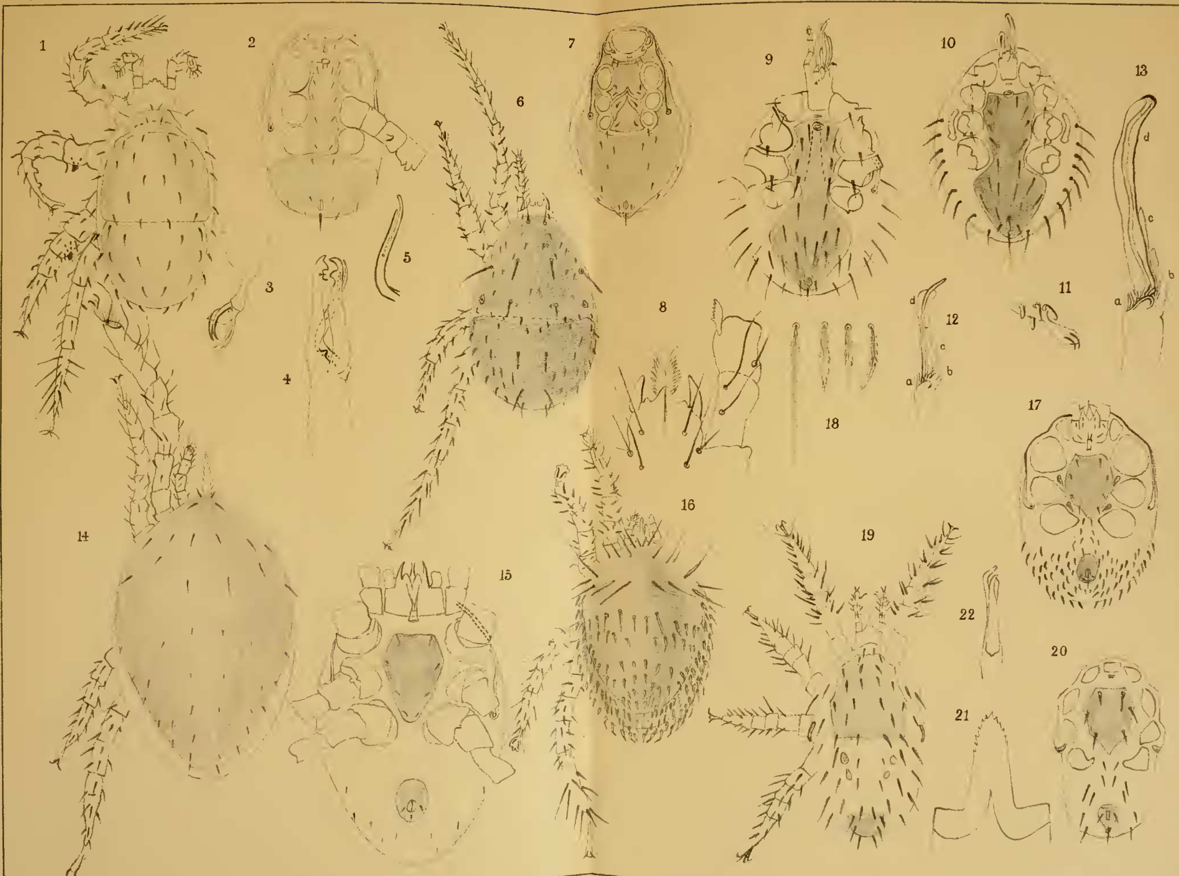
Fig. 1—5. *Parasitus marinus* (Brady).
» 6—8. » *evertsi* Oudms., **nov. sp.**
» 9—13. *Laelaps agilis* C. L. Koch.
» 14—15. *Emeus pyrenaicus* Oudms. **nov. sp.**
» 16—18. » *bosschai* Oudms., **nov. sp.**
» 19—22. *Liponyssus musculi* (C. L. Koch).

PLATE IX.

Fig. 23—26. *Liponyssus musculi* (C. L. Koch).
» 27—29. » *chelophorus* Oudms., **nov. sp.**
» 30—31. » *spinosus* Oudm., **nov. sp.**
» 32—37. *Spinturnix mystacina* (Klti.).

PLATE X.

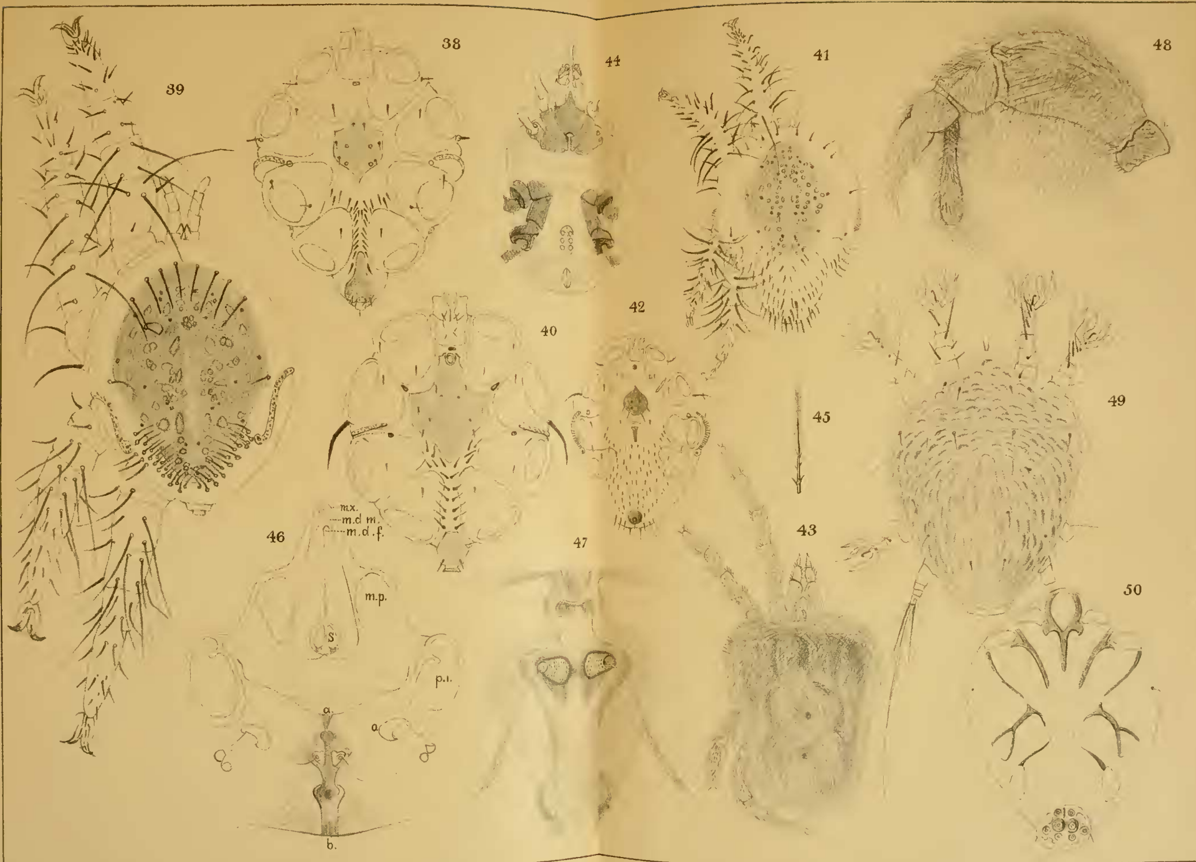
Fig. 38—42. *Spinturnix mystacina* (Klti.).
» 43—48. *Thrombidium tinctorium* (L.).
» 49—50. *Trichotarsus intermedius* Oudms., **nov. sp.**



A. C. Oudemans del. G. S. H. aut.

A. C. Oudemans del.

G. S H. aut.



A. C. Oudemans del.

G. S. H. aut.